

AMENDMENTS TO THE CLAIMS

Please amend claims 1, 11, 16, 18-21, and 33; cancel claims 36-42; and add claims 43-49 such that the status of the claims is as follows:

1. (Currently Amended) A method for making a three-dimensional object comprising the steps of:

providing ~~building~~ an object built from a polymeric or wax modeling material using a layered manufacturing rapid prototyping technique, wherein the built object has an object surface formed of the modeling material, ~~and~~ wherein at least a portion of the object surface has [[a]] at least one surface effect due to the layered manufacturing rapid prototyping technique, wherein the at least one surface effect extends substantially across an entirety of the object surface, and wherein the at least one surface effect is selected from the group consisting of a stair step effect, striation, a roughness due to errors in building the object, and a combination thereof;

exposing the object to vapors of a solvent that transiently softens the modeling material at the object surface; and

reflowing the softened modeling material to reduce the at least one surface effect.

2. (Previously Presented) The method of claim 1, wherein the layered manufacturing technique comprises fused deposition modeling.

3. (Previously Presented) The method of claim 1, where the modeling material comprises a thermoplastic resin.

4. (Original) The method of claim 3, wherein the thermoplastic resin comprises at least about 50 weight percent of an amorphous thermoplastic selected from the group consisting of ABS, polycarbonate, polyphenylsulfone, polysulfone, polystyrene, polyphenylene ether,

amorphous polyamides, acrylics, poly(2-ethyl-2-oxazoline), and blends thereof.

5. (Original) The method of claim 4, wherein the solvent is selected from the group consisting of methylene chloride, an n-Propyl bromide solution, perchloroethylene, trichloroethylene, and a hydrofluorocarbon fluid.

6. (Canceled)

7. (Canceled)

8. (Previously Presented) The method of claim 1, and further comprising the step of:
selecting a length of time during which the object is to be exposed to the
solvent vapors as a function of concentration of the solvent vapors,
prior to the exposing step.

9. (Canceled)

10. (Previously Presented) The method of claim 1, and further comprising the step of:
masking selected portions of the object surface with a substance that will
inhibit smoothing of the selected portions, prior to the step of exposing
the object to the vapors of the solvent.

11. (Currently Amended) The method of claim [[10]] 1, ~~wherein the masking substance is applied using an automatic process selected from the group consisting of a jetting process and a fused deposition modeling process~~ and further comprising building the object using the layered manufacturing rapid prototyping technique.

12-15. (Canceled)

16. (Currently Amended) The method of claim [[11]] 1, and further comprising ~~the step of:~~
~~identifying the selected portions of the object surface using a software~~
~~algorithm that creates a digital representation of the surface area to be~~
~~protected.~~
re-exposing the object to the vapors of the solvent to transiently resoften the
modeling material at the object surface; and
reflowing the resoftened modeling material to eliminate the surface effect.
17. (Canceled)
18. (Currently Amended) The method of claim 1, and further comprising the step of:
~~creating a digital mask of selected portions of the object surface for which~~
~~smoothing is not desired, using a haptic input interface~~ suspending the
object in a vessel containing the vapors of the solvent in a manner that
substantially allows the entirety of the object surface to be exposed to
the vapors of the solvent.
19. (Currently Amended) The method of claim 1, wherein ~~the building step comprises pre-~~
~~distorting certain object features so that said features will obtain a desired geometry~~
~~following the exposing step~~ exposing the object to vapors of the solvent transiently softens
the modeling material substantially across the entire object surface, and wherein reflowing
the softened modeling material reduces the surface effect substantially across the entire object
surface.
20. (Currently Amended) The method of claim [[19]] 1, and further comprising the steps of:
providing an initial object representation in a digital format, the initial object
representation having a surface geometry; and
modifying the initial object representation to pre-distort certain features of the
surface geometry, producing a modified object representation;
wherein the object built in the building step has a geometry defined according

to the modified object representation; and
wherein the desired geometry attained following the exposing step
approximately matches that of the initial object representation.

21. (Currently Amended) A method for making a three-dimensional object comprising the steps of:

providing an object built from ~~forming~~ a plurality of layers with a modeling material using a layered manufacturing rapid prototyping technique, wherein the ~~to build an~~ object has ~~having~~ an object surface, and wherein the plurality of layers create [[a]] at least one surface effect [[at]] extending substantially across an entirety of the object surface, the at least one surface effect being selected from the group consisting of a stair step effect, striation, a roughness due to errors in building the object, and a combination thereof;

exposing the object to vapors of a solvent that transiently softens the modeling material at the object surface; and

reflowing the softened modeling material to reduce the at least one surface effect [[at]] substantially across the entirety of the object surface.

22. (Previously Presented) The method of claim 21, where the modeling material comprises a thermoplastic resin.

23. (Original) The method of claim 22, wherein the thermoplastic resin comprises at least about 50 weight percent of an amorphous thermoplastic selected from the group consisting of ABS, polycarbonate, polyphenylsulfone, polysulfone, polystyrene, polyphenylene ether, amorphous polyamide, methyl methacrylate, poly(2-ethyl-2-oxazoline), and blends thereof.

24-26. (Canceled)

27. (Original) The method of claim 21, and further comprising the step of:

masking selected portions of the object surface with a substance that will inhibit smoothing of the selected portions, prior to the step of reflowing the surface.

28. (Previously Presented) The method of claim 27, wherein the masking substance is applied using an automatic process selected from the group consisting of a jetting process and a fused deposition modeling process.

29-32. (Canceled)

33. (Currently Amended) The method of claim [[28]] 21, and further comprising the step of: wherein the solvent is selected from the group consisting of methylene chloride, an n-Propyl bromide solution, perchloroethylene, trichloroethylene, a hydrofluorocarbon fluid, and combinations thereof.

~~identifying the selected portions of the object surface using a software algorithm that creates a digital representation of the surface area to be protected.~~

34-42. (Canceled)

43. (New) A method for treating a three-dimensional object built with a modeling material using a layered manufacturing rapid prototyping technique, the method comprising:

providing the three-dimensional object to a vessel configured to contain vapors of a solvent, wherein substantially an entire exterior surface of the three-dimensional object comprises at least one surface effect caused by the layered manufacturing rapid prototyping technique, wherein the at least one surface effect is selected from the group consisting of a stair-step effect created by layering of a plurality of layers of the modeling material, striation created by formation of roads

of the modeling material, surface roughness created by errors in the building of the three-dimensional object, and a combination thereof;
placing the three-dimensional object in the vessel in a manner that exposes substantially the entire exterior surface of the three-dimensional object to the vapors of the solvent, wherein the vapors of the solvent transiently soften the modeling material across the entire exposed exterior surface of the three-dimensional object; and
reflowing the softened modeling material to reduce the at least one surface effect across the entire exposed exterior surface.

44. (New) The method of claim 43, wherein the layered manufacturing rapid prototyping technique used to build the three-dimensional object comprises fused deposition modeling.

45. (New) The method of claim 43, where the modeling material comprises a thermoplastic resin.

46. (New) The method of claim 45, wherein the thermoplastic resin is selected from the group consisting of ABS, polycarbonate, polyphenylsulfone, polysulfone, polystyrene, polyphenylene ether, amorphous polyamides, acrylics, poly(2-ethyl-2-oxazoline), and blends thereof.

47. (New) The method of claim 43, wherein the solvent is selected from the group consisting of methylene chloride, an n-Propyl bromide solution, perchloroethylene, trichloroethylene, a hydrofluorocarbon fluid, and combinations thereof.

48. (New) The method of claim 43, wherein placing the three-dimensional object in the vessel comprises suspending the three-dimensional object in the vessel.

49. (New) The method of claim 43, and further comprising masking selected portions of the exterior surface with a substance that will inhibit smoothing of the selected portions.